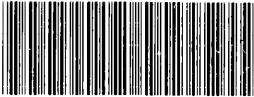


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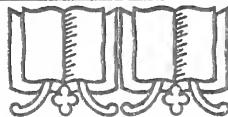
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The Chief

THE GOVERNMENT WEEKLY



Janitor and Janitor Engineer



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5 Beekman Street
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FOREWORD.

The examination for Janitor, Janitor-Engineer and Janitor with knowledge of steam heating is one of the most popular tests given for city positions. One reason for this is that the eligible list is active. In other words, there are many appointments and most lists are exhausted before the end of four years, the time a list is permitted to run. The work is steady and the pay is good, two things that mean much to the average man, who has to depend on his daily wage for the support of himself and family. Then too, the position of Janitor in the city service is very different to the same position in outside employment, such as apartments or private offices. Under civil service the position is one of considerable responsibility, and commands respect where the Janitor shows himself worthy of it.

The fact that the examination is popular makes it necessary for the man who wants to stand well on the list to learn all he can about the practical duties, and the knowledge required to perform them satisfactorily. Every scrap of information that will tend to give him a better understanding of a city janitor's work is valuable and ought to be studied well.

Applications for the position are given out at Room 1119, 299 Broadway, but they can not be had until a date is set for the examination, which is promptly printed in THE CHIEF. In the examination for Janitor Engineer and Stationary Engineer, held December, 1907, the subjects and weights were: Technical, 6; Experience, 3; Mathematics, 1. The minimum age was 21 years, and the salary \$750 and up.

For Janitor and Janitor Steam Heating, held January 28, 1910, the subjects and weights were: Technical, 6; Experience, 4. The minimum age was 21 years and the salary from \$600 to \$1,500. A physical examination preceded the mental test.

Janitor and Janitor Engineer

That the Board of Education affords opportunities for advancement to its employes in the administrative branch of the service is strikingly illustrated in the career of Henry M. Devoe, Deputy Superintendent of School Buildings, Brooklyn. Mr. Devoe entered the Department in 1885 and is the oldest attache in continuous service. From a comparatively minor position he rose step by step, passing through all the grades of the service, including Draughtsman, Chief Draughtsman, Deputy Superintendent, and for several months Acting Superintendent in charge of the old City of New York prior to consolidation. From 1902 up till about a year ago, when he was appointed to his present position, Mr. Devoe was Supervisor of Janitors. It will thus be seen that there are few, if any, officials in the Department as competent to discuss the position and duties of Janitor. Speaking in this connection he says:

"We have school houses of various kinds to take care of, and the men called upon to care for these schools must possess different qualifications, corresponding to the size and capacity of the schools over which they have charge."

In answer to the question as to the distinction or the classification of schools in respect to the work of janitors, Mr. Devoe replied:

"We divide the school houses into three classes: (1) The old-fashioned schools heated with stoves and furnace, or a combination of them; (2) then the school house heated with hot water and steam in the simplest form; and then (3) the modern up-to-date heating plants. Of course, this necessitates a large equipment of machinery.

"We take in the three grades in the position, ordinary janitor, janitor with a knowledge of steam heating, and janitor-engineer; but in each case they must be primarily good ordinary janitors, no matter what their other mechanical and technical qualifications may be. The fact that they should first possess the qualifications of a janitor, pure and simple,

must not be lost sight of, for that forms the foundation of their higher work. We have three kinds of schools, and we must have three different classes of men to take charge of them."

Mr. Devoe was asked whether many men going into these positions, equipped with a technical knowledge of engineering and steam heating, did not object to the title of "Janitor."

"Yes," said he, "the main objection is the name 'Janitor,' but that is due mainly to the comic newspaper efforts to be funny at the expense of every house janitor. The department has often sought for a name that would describe his duties better than that of Janitor or Janitor-Engineer. He is more than a caretaker and more than a custodian. He often has to deal with complicated machinery and his requirements are largely of a technical character."

To the query as to the needs of the Department, Mr. Devoe replied:

"The Department is constantly on the lookout for and experimenting with new methods of cleaning apparatus. Probably every invention that has been made in the way of cleaning material or apparatus has been submitted to and tested in the Department, and those inventions that are found to be valuable and an improvement on old methods are submitted to the Committee on Care of Buildings, and when indorsed by them are turned over to the Committee on Supplies, with the request that they be added to the Janitor's Supply list. For instance, we experimented with scrubbing machines, and also went into the pneumatic and vacuum systems of cleaning of various kinds.

"Since the office of Supervisor of Janitors was established they have added many articles to the supply list, all of which have tended to the better keeping of our school houses; and the schools are much better kept to-day than they were five years ago, so far as their cleanliness and care are concerned, the ultimate object of which is, of course, the prevention of disease and the preservation of health."

Speaking of the segregation of authority as far as care of buildings is concerned, Mr. Devoe said:

"The Committee on Care of Buildings was organized in 1902 as a separate committee and the work of supervision of the care of school buildings was placed under its charge. Previous thereto the supervision of janitorial work had been in the hands of the Building Committee in the Boroughs of Manhattan and the Bronx, the Building Committee in the Borough of Brooklyn, and the various local school boards and committees in other boroughs. In those days there were no uniform rules or regulations for the guidance of janitors

and there was practically no supervision. The Committee on the Care of Buildings, when organized, immediately proceeded to formulate and enforce rules and regulations applicable to the care of school buildings in all the boroughs equally and with no discrimination."

"Was the endeavor to obtain a fair equalization of salaries attended with some difficulty?"

"Yes," Mr. Devoe replied, "we had to go before the Board of Estimate and Apportionment and the Board of Aldermen to gain the equalization of salaries. Believing that the Manhattan men were receiving only a fair compensation for their work, all salaries were equalized to conform to that standard. The fact that janitors in Brooklyn and the Bronx did not theretofore receive the same compensation as those in Manhattan had a deterrent effect on their industry; they did not do their full duty and it made my work doubly hard. It took a five weeks' fight to get the salaries equalized; I gave up my vacation to prepare estimates for the Board of Estimate and Apportionment and the Board of Aldermen, and the committee was extremely pleased that the appropriation was granted and took effect January 1, 1907."

The question of providing living quarters for the janitors of school buildings has engrossed the attention of school authorities for many years, and much thought and discussion has been given to the subject of keeping the school houses free from contagious disease and at the same time providing suitable quarters for the janitors.

"The Committee on Care of Buildings," continued Mr. Devoe, "thoroughly discussed the problem, and they passed a resolution requesting the Building Committee, in preparing plans for all future large school buildings, to provide janitor's quarters on the roofs, where, if necessary, the family can be isolated in case of illness, and thereby affording full and complete protection to the building at all times. The by-laws of the Board of Education provide that the janitor shall live within 1,500 feet of the school buildings; but that is not always possible. Out in country places where there is not a house perhaps within a thousand feet of a school house, it is impossible to live up to that rule; and again, in the congested districts of the city, especially in the Hebrew and Italian quarters, it is utterly impossible for the janitor to secure reasonable accommodations anywhere within the prescribed radius of his school buildings; so the committee came to the conclusion that the best thing to do, taking into consideration the protection of school children and the proper performance of duty by the janitor, was to provide quarters for them on the roof, the same as is now done in large office buildings. In olden

days the janitor lived in the basement, and that was found to be undesirable—they would have children, and the children would get sick."

In comparing the modern school building with the old-time red brick school house, the Supervisor said:

"Our modern buildings are fireproof from top to bottom and the janitor is 'on the job' all the time. All modern school buildings are big fireproof structures, and the later buildings are being furnished with air chutes, janitor's sinks on every floor, hot water throughout—in fact, all the latest improvements to enable a man to keep his building in good condition. The Superintendent of School Buildings is continually studying all questions appertaining to the construction, maintenance and proper sanitation of the buildings under his care, with the result that our school buildings stand as the highest type of school buildings all over the world.

There has been much diversity of opinion as to the best means of paying janitors—directly or indirectly—whether to pay them a salary and also pay their help directly, or whether to pay the janitor a bulk sum, he to pay his own help therefrom. On this subject Mr. Devoe said:

"Such buildings as we have deserve and demand adequate salaries for the men who care for them. The salaries of janitors from the first year on range from \$480 per year for a one-room school building in the country, to \$8,448 for a first-class school building in the city. Many of the janitors draw \$5,000 a year and over. These salaries under the present system are not fixed at any specific sum, but depend upon the size of the school, its floor surface, the number of boilers, furnaces, engines, dynamos, etc., to take care of. These salaries are also exclusive of the following extra compensation, viz.: Salaries for evening schools, evening play centres, mothers' and babes' play grounds, vacation schools, vacation play grounds and free lectures. As these additions to the regular school curriculum entail extra work in the school districts in which they are located, the amounts paid for such service are in addition to the regular salary."

On the particular subject of the future of janitors and janitor-engineers in the Board of Education, Mr. Devoe had this to say:

"The public janitors of New York City are the best paid of any occupying similar positions in any other city in the country, and by reason of the nature of the school buildings the city is now erecting, the equipment thereof and the size of the salaries paid to janitors, we are attracting to our service the very best men in the country, such, for instance, as engineers of large power plants, hotels, office buildings and

ocean steamers. Within the past few years men of this class have come into the service in considerable numbers. As the old-time red brick school house, heated by stoves, disappears, so the old-time janitor is disappearing, and his more educated brother, equipped with a knowledge of steam and electrical engineering and the care of dynamos, takes his place as the custodian and caretaker of public buildings.

"The Committee on Care of Buildings has tried, and tried honestly and fairly, the system of direct employment where the city employed all cleaners, firemen, engineers, janitors, etc., in the care of buildings, and have not found it generally practical. In rural districts it may work very well, but in the city it is more expensive than the indirect system, whereby the janitor is paid a lump sum and hires his own help. In the more central portions of the city, like Manhattan, Brooklyn and the Bronx, the direct system of payment has not been a success, although the janitors in charge have done their utmost to carry out the wishes of the committee and have given the system a fair trial. Its non-success apparently arises from the lack of power of immediate dismissal in the hands of the janitor. Under the old system the janitor's sole remedy for non-attention to duty or insubordination would be to report the matter to this office, when an investigation would be made, and if necessary the delinquent suspended by the President of the Board and placed on trial before the Committee on Care of Buildings, all of which is a very lengthy process, and does not conduce to good results. Another thing which militates against the success of the direct employment system is the amount of absences from duty among the help. Knowing that the limit under Civil Service Rules is five days, they apparently absent themselves for four days."

An additional incentive to diligent performance of duty is the system now in vogue of giving to worthy janitors letters of commendation. Members of the Committees on Repairs of School Buildings and Care of Buildings are in the habit of visiting school houses at irregular periods, which are unknown to the janitor in charge, and if they find the school house in good condition as to cleanliness, they issue to the janitor what is called a "letter of commendation." This letter is, in a measure, a passport to future advancement and places the recipient thereof practically on a merit basis, for promotion. An instance of the individual interest taken by the members of the committee in the proper maintenance of the schools occurred at the time of this interview, when one of the members of the Board came into the room and reported that on a certain school he had noticed a broken flag staff, which elicited the remark:

"You see, I want to emphasize the remark of the committee in what they are doing and what they mean to accomplish for the benefit of the janitor. The future of the janitor is co-existent with the growth of the city, the tendency to build larger school buildings, to equip them with more modern plants and appliances, all of which means increased salaries. I want to say that the positions of janitor-engineer and janitor is one of importance and dignity. A man who has charge of a building worth, say, a half a million dollars, a heating plant worth \$50,000 to \$75,000, and mechanical equipment worth perhaps \$100,000—that man, in my opinion, is of some importance in the community. The committee itself is taking such an active interest in it that they have their fingers on the pulse of the system at all times."

RULES AND REGULATIONS

Of the Department for Janitors, Janitor-Engineers,
Engineers and Cleaners

Sec. 115. 1. No person shall be eligible for the position of janitor or janitor-engineer who is unmarried at the time of appointment and under the age of twenty-five years.

2. Every janitor, janitor-engineer and cleaner shall, on appointment, file with the Supervisor of Janitors a certificate from the Board of Health or a duly qualified practicing physician that he or she has been properly vaccinated. On the first day of October and on the first day of April in each year, every janitor, janitor-engineer and cleaner in charge of a school building shall file with the Supervisor of Janitors a list of all persons employed by him or her in caring for said building, with a certificate of vaccination of each person so employed whose certificate has not been previously so filed. He or she shall also file a list of the members of his or her family residing in the school building, with a certificate of vaccination of each person whose certificate has not been previously so filed. Such certificates shall be renewed at least once in five years. In the case of persons engaged for service in a school building between the dates above named, certificates of vaccination shall be filed with the Supervisor of Janitors within ten days. (As amended May 27, 1903, and April 14, 1909.)

3. Every janitor, janitor-engineer, cleaner or other employee in charge of a school building shall reside within 500 yards of such building, measured by the nearest route through the public streets, unless by permission of the Committee on Care of Buildings. (As amended November 23, 1903, and May 10, 1911.)

4. A janitor not residing in his school building shall furnish and maintain at all times in a conspicuous position at the main entrance of such building, so as to be visible from the street, a sign giving his name and residence, according to a form prescribed by the Supervisor of Janitors.

5. He shall provide himself with a prescribed cap, to be

worn whenever he is on duty, and see that all his assistants are provided in like manner.

6. A janitor of a school building in which there are girls shall have at least one woman assistant of mature age who shall be in attendance from the opening of the building, and who shall, in addition to her general duties as assistant, be specially charged with overlooking the yards and playgrounds of the girls' department and classes, and the care of the rooms and toilet rooms of women teachers. Exceptions to this rule may be made by the Committee on Care of Buildings.

7. No janitor or assistant who cannot speak and read English shall be employed.

8. Personal illness on the part of a janitor sufficient to incapacitate him from service, and all absences from duty, shall be immediately reported by the principal of the school to the Supervisor of Janitors, together with the name of the person placed in charge of the building; and pay shall be forfeited for the time lost through absence, unless the same is excused by the Committee on Care of Buildings.

9. When the person in charge of a school, whether a janitor, janitor-engineer or cleaner, is incapacitated and fails to furnish a substitute, the principal of said school shall immediately notify the Supervisor of Janitors, who shall forthwith provide for the maintenance of janitor service in the building. (As amended April 14, 1909.)

10. Application by a janitor for excuse for absence with pay on account of illness shall be forwarded to the Supervisor of Janitors and shall be accompanied by a physician's certificate; and application for excuse for absence for any other cause shall be accompanied by a written statement certified by the principal.

11. A janitor who has been one year or longer in the service of the Board, calculated from July 1 of any year, may be granted, in the discretion of the Committee on Care of Buildings, a vacation with pay, not exceeding ten days in duration, dated from 12 M. of any day from July 1 to September 1, provided that the Supervisor of Janitors shall certify that the janitor is not required at the school building during the time of the proposed vacation; and provided that the school building be left by the janitor in charge of a responsible assistant, whose name and residence must be certified to the Supervisor of Janitors two days prior to the date of the beginning of said vacation, and the receipt of such certificate shall be acknowledged in writing by said Supervisor. A janitor thus leaving his building in charge of another shall be held responsible for that person's acts.

12. In the event of there being at any time a case of con-

tagious or infectious disease in the family of a janitor, he shall at once report the fact in writing to the principal of the school and also to the Supervisor of Janitors, with a written statement from an attending physician stating the nature of the disease, and whether or not the patient is isolated, what other precautions have been taken, and whether it will be safe for the janitor to perform his duties in the school building.

13. A janitor shall report at the office of the Supervisor of Janitors, at least once each month, the condition of the heating, ventilating, electric light and power plants in the building under his charge, and sign his name in the register kept for that purpose.

14. Any janitor, janitor-engineer, cleaner or other employe under the supervision and control of the Committee on Care of Buildings, intending to resign his position, shall give said Committee at least ten days' notice of his intention to so resign, under a penalty for a failure to comply with this by-law, of a deduction of ten days' pay from his salary. (As amended November 25, 1903.)

15. Janitors and janitor-engineers shall exercise great care in the selection of assistants and helpers, and shall take pains that none but persons of good moral character are employed; and they will be held responsible for the conduct of such assistants and helpers. No assistant or helper who is under the age of eighteen years shall be employed. (This subdivision was adopted October 25, 1905, and amended October 13, 1909.)

Sec. 116. 1. The janitor of a school building shall devote his entire time to the care of the building in his charge, and, except as herein otherwise provided, shall personally be present in such building each day from 8 A. M. to 5 P. M., and from 8 A. M. to 12 M. on Saturdays, and during such other times as the building is in actual use, unless excused by the Committee on Care of Buildings, the principal, or the Supervisor of Janitors. He shall also visit and inspect the building at least once on each Sunday and holiday. When a janitor is excused by a principal, the principal shall, upon the same day, report his action to the Committee on Care of Buildings, with the reasons therefor. (As amended April 14, 1909, and October 27, 1909.)

2. He shall report in person to the senior principal of the building at the beginning of each daily session; and shall at all times, including lunch hours and recesses, be ready to render immediate personal assistance in cases of emergency. Upon furnishing a substitute acceptable to the principal, a janitor may be permitted to absent himself from the school premises between 12 M. and 1 P. M.; but the principal may, upon

application to and with the consent of the Committee on Care of Buildings, permit such absence between 1 P. M. and 2 P. M. (As amended April 14, 1909, and October 27, 1909.)

3. He shall take every possible care and precaution for the safety and preservation of the building and school property. He shall see that the equipment for extinguishing fire is in constant readiness for use. (As amended April 14, 1909.)

4. He shall receive, if required, all mail matter for the principal, teachers, and school officers, and on school days immediately and personally deliver the same to the principal.

5. He shall report to the principal any instance of the use of any piano before 8.45 A. M., or after the close of the school session, and by whom the same was used.

6. He shall prevent any unauthorized person from entering the building or meddling with any part thereof or with property therein.

7. No dogs or fowl shall be kept on any part of any school premises, and smoking shall not be allowed in any school building at any time.

8. The janitor shall have all the gates or doors leading from the street to the building and yards open on all school days at 8.30 A. M., and on stormy days at 8.15 A. M., and close them thirty minutes after the close of the school session, unless otherwise directed by the senior principal. All exits shall be left unfastened on the inside during school hours. The doors to the main entrance shall be left unfastened from 8 A. M. until thirty minutes after the close of the school session on all school days.

9. He shall visit every room, watercloset, passage, stairway, yard, etc., on the school premises before securing the exits at the close of each school day.

10. He shall display the United States National colors upon (or near) the school building on all designated legal holidays from sunrise to sunset and on each school day, raising the flag at 8.30 A. M. and lowering the same at the close of the school session, and at such other times as the Board of Education may direct, and shall keep and maintain the flags in good order and repair. No flag other than the United States National colors shall be so displayed at any time. Special orders in regard to display of flags shall be given by the President of the Board of Education. The colors on Decoration Day shall be displayed at half-mast.

11. He shall regularly wind and regulate the clocks throughout the school building, and report to the principal if any are out of order.

12. He shall keep a sufficient supply of toilet paper in every watercloset on the school premises.

13. He shall report in writing immediately to the principal and the Superintendent of School Buildings any damage done to school property and, in case of fire or other great disaster to school premises, shall immediately notify the Superintendent of School Buildings.

14. He shall notify in writing the Superintendent of School Buildings whenever any contractor begins work at the school in his charge.

15. He shall make small repairs to the heating apparatus, locks, doors, furniture, etc., and if adjustable furniture is used make such adjustments in the height thereof as may be required. All worn-out and leaking washers shall be replaced from time to time as occasion may require.

16. He shall replace all broken glass and sash cords of the windows with new as often as they may be broken; new glass and sash cords to be obtained from the Superintendent of School Supplies, subject to such rules and regulations as the Committee on Supplies may prescribe.

17. He shall examine all work being done upon the premises in his charge, and report immediately to the Deputy Superintendent of School Buildings for the Borough any observation of defective materials or bad workmanship, any overcharge for time and materials, or any failure to comply with specifications.

18. He shall disconnect electric light and power current from the school building at the service switch upon leaving the school building each night. Record must be kept, with dates, of the gas and electric meter readings on the first day of each month, of all gas and electric meter readings when made by the gas and electric companies, and of the readings of all gas and electric meters when installed and when removed, and report of same shall be made in writing to the Auditor of the Board of Education.

19. He shall keep, in a book provided for the purpose, a correct list of all movable articles of furniture, fittings, etc., exclusive of those furnished under the list of supplies, and add thereto all articles, such as desks, seats, radiators, etc., which for any reason are removed from their places and left unsecured or disconnected. He shall also enter in said book a complete and accurate list of all articles of furniture, including pianos and radiators, that are in use in any part of the school building.

20. He shall see that no articles are removed from the school building by any person except on a written order from the Superintendent of School Buildings or the Deputy Superintendent of School Buildings for the Borough. He shall see that all such deliveries and the receipt of new furniture,

pianos, radiators, etc., are immediately entered in the book specified in subdivision 19. All entries must be made in ink; no erasure of any word or figure shall be made other than by simply drawing a pen through the word or figure, but not so as to destroy the legibility of the same. The inventory book must be kept in a careful manner and in a clean condition, and must be submitted to the inspector assigned to the district in which the school is situated for verification of the articles enumerated in the inventory, and approval of said inventory, once in every six months, and whenever a janitor is removed, transferred, or permanently assigned to another school. (As amended January 25, 1911.)

21. He shall at the end of each school year receive from the principal all school supplies in the building, also all keys, and give a receipt for the same; and he shall be held responsible for all supplies in the storeroom during all times when the same is not in charge of the principal.

22. He shall honor all requisitions made by the Superintendent of School Supplies for the transfer of school supplies from one school building to another.

23. He shall sweep all the rooms, entries, passages, stairways, playgrounds, yards and closets used for school purposes, and shall dust all furniture and fixtures in the rooms and all window sills, wainscoting and woodwork after the close of school on each school day and before 8 o'clock in the morning of the next school day thereafter.

24. He shall, at least once in each school month, scrub the floors in all entries, passages and stairways and in all rooms occupied for school purposes, and shall dust the side walls, blinds and cornices, and clean the windows every two months, or oftener if necessary. Blackboards shall be washed and thoroughly cleaned whenever required by the principal. Water must not be poured or spilled on the floors from pails or hose. (As amended May 27, 1903.)

25. At least once each week the doors and door knobs of school rooms and the hand rails and banisters of stairs shall be washed with a solution of one-half pound of washing soda to three gallons of water.

26. Floors and seats of sanitaries shall be washed, thoroughly cleaned and disinfected every day after school sessions and kept dry during sessions. All pupils' ranges, water-closets, urinals and stalls shall be cleaned down with diluted muriatic acid once each month.

27. Janitors shall thoroughly clean the school buildings under their charge immediately prior to the opening of the schools in September in each year.

28. The water supply to all automatic flushing sanitary

apparatus shall be turned off at the close of school each day, and on again just before the opening of school in the morning. Every precaution shall be taken in cold weather to prevent all pipes and other apparatus from freezing.

29. All storage water tanks shall be emptied, scrubbed and thoroughly cleaned at least once each year, during the vacation period.

30. The janitor shall keep in order the storerooms, boiler rooms and cellars, and allow no accumulation of ashes, waste paper or refuse therein. All ashes and refuse shall be put into metal cans furnished by the Board of Education, which shall be placed on the sidewalk daily for removal.

31. All smoke pipes, boiler tubes and sections shall be kept cleaned and free from soot and ashes, and the tops of all smoke, steam and water pipes clear of dust. Fronts of boilers and furnaces shall be kept neatly painted with black varnish and all stoves neatly polished.

32. Ash pits shall be kept free from accumulation of ashes and cinders, and every care taken of the grates in order that they may not be ruined by neglect to keep the pits free and by failure to turn and leave revolving grates with flat sides up.

33. Cremating sanitaries shall be burned and cleaned out once each month, and fire shall be continuously kept going in the stack heaters in all sanitary vent flues from the opening of school in September until they are burned and cleaned out at the close of school in June. During the vacation period the shutters shall be taken down from the indirect stacks, and the stacks, heat and vent flues, the cold air inlets, and the registers in classrooms, shall be thoroughly cleaned and dusted. (As amended March 25, 1903.)

34. The janitor shall thoroughly ventilate every classroom at the close of each school day by opening windows and doors, except in case of storm, and again between the hours of 7 and 8 A. M., weather permitting.

35. He shall have the temperature of all rooms occupied for school purposes at not less than 58 degrees Fahrenheit, at 8 A. M. on each school day, and shall maintain the temperature between 65 and 68 degrees Fahrenheit throughout such rooms (with the exception of the gymnasium, in which the temperature shall be maintained between 60 and 65 degrees Fahrenheit) from 9 A. M. until school is dismissed. (As amended January 25, 1910.)

36. He shall have the ventilating apparatus in full and complete operation by 8.50 A. M. each school day, and run the same to its full capacity during school sessions, unless otherwise specially directed by the Superintendent of School Buildings. A stoppage exceeding twenty minutes in duration

will be regarded as a violation of this rule, and will subject the janitor to forfeiture of pay for the day or days (portion of a day exceeding twenty minutes to be regarded as a full day) during which the apparatus is not in operation.

37. He shall keep roof playgrounds, sidewalks, gutters, yards and grass plots, clear and clean.

38. He shall remove all snow from sidewalks and gutters adjacent to the school building before eight o'clock in the morning of every school day on which snow falls; and in all cases within four hours after snow ceases to fall, as provided by the Code of Ordinances of The City of New York, the time between 9 P. M. and 7 A. M. not being included in said period of four hours; and he shall remove all snow from all yards, pavements and passages within twenty-four hours after the cessation of any snowstorm. He shall keep fire-escapes clear and clean at all times. (As amended January 26, 1910.)

39. He shall visit the roofs at least once each week and examine the same. Snow and other accumulation must be removed from roof playgrounds and all gutters, leaders and leader heads, and the same kept free at all times. Birds' nests shall be cleared from all parts of the building, and birds prevented from building or roosting in any part of the building.

40. The janitor shall preserve intact all burned out or otherwise defective electric lamps in buildings having electric light service, and when required shall deliver the same to the electric light company and receive in return the proper equivalent of perfect lamps. When defective lamps have accumulated to the extent of 75 per cent. of the reserve, the janitor shall notify the electric light company to exchange the same.

41. He shall see that the brushes of dynamos and motors are kept in proper alignment, with good spring tension contact with commutator and free from sparking; that commutators are kept clean and free from brush dirt and grease. In cleaning commutators only No. 00 sandpaper and cloth as free from lint as possible shall be used; under no circumstances must emery cloth be used.

42. He shall, before starting motors, see that the starting or controlling rheostats are in the "off" position, before the main switch is thrown in. On alternating current motors, care must be taken, after shutting down, that the switch or auto-starter is in the "off" position or between points, particularly when also controlled by a main switch at switchboard or at service; where no auto-starter is used and resistance is in the secondary of the motor, the handle controlling the resistance must be immediately pulled out as far as it will go before leaving the motor and after pulling the controlling switch.

43. Oil cups must be kept properly filled, and when motors or dynamos are not in use shall be carefully covered with the covers provided for the purpose.

44. The janitor shall replace blown-out fuses by new of the same size; he shall keep on hand a proper supply of fuses. In the event of a fuse blowing out more than once at any particular time, the circuit protected by said fuse shall be left disconnected and the Superintendent of School Buildings notified at once.

See, 117. 1. An applicant for the position of engineer in a school building in which there is any machinery, such as pumps, engines, dynamos, fans, etc., besides having the qualifications required by the Municipal Civil Service Commission, shall present to the Committee on Care of Buildings an engineer's license, or a series thereof, issued by the Bureau of Inspection of Steam Vessels, or the Sanitary Squad of the Police Department of The City of New York, or like examiners duly authorized by law, which shall certify that the applicant has been examined and licensed as an engineer of not less than third grade.

2. During the school term when steam pressure is on the boilers, the engineer shall remain in and about the boiler room.

3. He shall have charge of and be responsible for the boilers, engines, dynamos, pumps, fans, steam pipes and all apparatus under his charge, and take precaution for the safety of the same.

4. He shall provide, as far as practicable, against damage to any portion of the school property arising from the use or non-use of said apparatus.

5. In case repairs beyond his ability to make are necessary, he shall immediately report the necessity thereof to the Supervisor of Janitors. (As amended April 14, 1909.)

6. Cleaners in school buildings employed by the Board of Education shall be under the direction of the janitor and under the supervision of the principal, and subject to all of the rules and regulations governing janitors. (As amended April 14, 1909.)

7. It shall be the duty of the principal, as provided by subdivision 8 of Section 43 of these by-laws, to direct the janitor and see that he properly performs his duty. The principal shall immediately report in writing to the Committee on Care of Buildings any failure or omission to comply with the provisions of these by-laws, and any other delinquency, on the part of a janitor, janitor-engineer or cleaner. Each janitor, janitor-engineer or cleaner in charge of a school building shall make a detailed report on the fifteenth of each month from September to June, inclusive, regarding his attendance and

the proper performance of his duties; such report shall be made to the principal on a blank prescribed by the Committee on Care of Buildings. (As amended April 14, 1909.)

8. Any and all circulars sent to janitors by the Committee on Care of Buildings and by the Supervisor of Janitors shall be kept on file, and the directions therein contained shall be deemed to be in force until amended or repealed. (This subdivision was adopted April 14, 1909.)

PRACTICAL DUTIES

The janitor's duties are generally undervalued, yet they call for more knowledge than is generally supposed. To attend to his duty properly he should know his business thoroughly, be prompt, reliable, and above all, sober.

His duties, so far as order, cleanliness, and punctuality are concerned, are clearly explained under the heading Rules and Regulations. To the average candidate in an examination the most difficult questions to answer are those pertaining to the heating apparatus, the care and treatment of boilers, etc., and a few practical hints on those subjects will help the candidate over many difficult places.

To begin with: experience alone can teach a man how to fire in the best and most economical manner under the various styles of boilers. It is necessary that the boiler-room, as well as tools, boilers and fixtures, should be kept clean. Every tool should have its place, and be kept there when not in use. Before starting a fire under a boiler, the janitor should see:

1. That there is sufficient water in the boiler—not only by looking at the glass water-gauge, but by trying the gauge-cocks.
2. That the furnaces and flues are clear, and that grate-bars are not broken or warped badly, (in which case they must be removed and new ones substituted).
3. That the upper gauge-cock is open, to allow air to escape while steam is forming.
4. That the blow-cock is shut.
5. That dampers and doors move freely.
6. That the boiler hand-pump, if there is one, is in good working condition.
7. That the glass water-gauge is clear and shows the true water-mark.

He should then cover the grate-bars with a layer of coal, beginning at the bridge-wall and extending two-thirds of their length toward the furnace-door; then, on the open part of the bars, he should pile his wood, cob-house fashion, put a few

lighted shavings or oil waste in the mouth of the furnace, partially close the furnace door, and wholly close the ashpit-door. After the wood is fairly burning, coal may be thrown on it, and the furnace-door wholly closed, and the ashpit-door opened. More coal is thrown on as soon as the fire will bear it, and the fire is gradually pushed back, till there is a full fire on the whole length of the bars.

In firing with "hard," or anthracite, coal, a thickness of from six to eight inches should be kept on the bars; with "soft," or bituminous, coal, the thickness should be from eight to ten inches; and with coke, from ten to twelve inches.

After the fire is started, and steam has commenced making, he should try his safety-valve, to see that it moves freely, and examine joints for leaks.

The fire must not be hurried; it must be allowed to come up very gradually, and to do this in the best manner, **put on only a little coal at a time.**

The firing is done properly only when the fuel is consumed in the best possible way—that is, when no more is burned than is necessary to produce the amount of steam required, and to keep the pressure uniform.

To attain this end, complete combustion must be obtained in the furnace, and this is going on when the fuel is burning with a bright flame evenly all over the grate.

When the fires are going well, they should be fired at regular intervals and lightly. It has been found better in many cases, to fire only one side of a furnace at a time, but of this each janitor must be his own judge, from his own experience. No two boilers can be fired exactly alike and produce the same results. The firing must be done quickly, keeping the furnace-door open as short a time as possible.

The ashpits must be raked out frequently, and the air spaces between the bars must be kept free also. All ashes must be hauled to some distance from the boiler fronts and quenched, and then wheeled to the ash-pile.

The fire should not be stirred any more than is necessary, in order to avoid the waste of small coal dropping through the bars. With a strong draught it is well to partially close the damper while firing, to avoid contraction of the boiler sheets as much as possible, or to partially close the ashpit-doors for the same reason.

When the clinkers and dirt accumulate to an extent sufficient to clog the draught, the fire should be cleaned. It is as well to clean only one-half at a time, by breaking up the clinker with a slice-bar, and then hauling it out with a rake, then firing lightly, doing the whole as quickly as possible.

A fire should run without cleaning, with good coal, about twelve hours.

Never close the damper, especially at night, while there is a fire on the grates, as gas may collect in the flues, and if the fires are banked, and should blaze up, an explosion of the gas might take place and ruin the boiler. There is reason to believe that boiler explosions have been produced in this manner.

The practice of wetting coal before throwing it into the furnace cannot be too severely condemned, as it is wasteful of heat and produces corrosion.

The boiler, flues, and furnaces should be cleaned frequently —to avoid loss of heat, which means waste of fuel.

Blowing off steam at the safety-valve, or opening the furnace-doors, to prevent a rise of steam-pressure, causes loss of heat, and will never occur where a fire is properly managed, except upon an emergency.

A boiler should have its feed-water continuously and regularly supplied, and the water-line should be kept at regular height, and there should never be less than three or four inches in depth over the highest part of the furnaces, flues, or connections exposed to the flame.

When a boiler is cold and filled with water, it will be found that, after the fire is lighted and steam is raised to the regular pressure, the gauge-cocks and water-glass show a higher water-level than before the fires were started; this is owing to the expansion of the water by the heat.

The steam-pressure never should be allowed to exceed the highest limit. If the steam-gauge shows that the steam-pressure is rising rapidly, and that there is danger of exceeding the limit, water should be fed in at once, and the draught checked by the damper or ashpit-doors; and if the pressure should exceed the limit, the furnace-doors should be opened, the ashpit-doors nearly closed, and the feed started, unless the water is so low that there is danger from that, in which case the feed must not be started.

A boiler needs cleaning out more or less often during a year, dependent upon the amount of impurities in the feed-water.

When a boiler is to be cleaned out, **the water must not be blown out by the pressure of the steam.** The water must be allowed to remain in the boiler until it is cool, and then it must be permitted to run out through the hand-holes and blow-off cock. The scale must be knocked off with light blows of the hammer, or scraped with chisels, or loosened with angular wire chains, etc.; and the boiler must be washed inside with clean water. The scale should be removed as soon as pos-

sible after the water has been let out of the boiler, before it has time to dry and harden.

When the boiler is cleaned, the blow-cock should be taken apart and the plug cleaned and oiled, and made to work water-tight and easily; the check-valves should be examined, and made tight if leaky; the feed-pipes and blow-out pipe should be examined and cleared of sediment, if any exists. If the safety-valve has been found to work imperfectly, or to leak steam, advantage should be taken of the boiler's not being in use to examine the pins, clean and oil them, to clean and oil the guide, and to grind in the valve.

After the boiler has been cleaned, and the flues and connections swept, it should be seen that the braces are not badly wasted by corrosion, or sheets pitted, or rivet-heads caten away, etc.; that the packings and pipe-flanges are in good order.

Remedy all defects as soon as found, when it is possible to do so.

If you find that your feed-water causes considerable incrustation, you can prevent it to some extent by using a scum-pan in the boiler near the surface of the water, connected by a pipe passing through the boiler-shell. A couple of inches or less of water blown off at morning, noon, and night will aid very materially in reducing the amount of scale. Blowing out from the bottom is of very little use in removing scale or sediment.

All the water should never be blown out of a boiler, except as an actual necessity, and then never should be done under a higher pressure of steam than ten or fifteen pounds. But the fire should always be drawn before the blowing-out is attempted; and the doors and dampers must be closed to prevent too rapid cooling; also, to prevent the formation of a vacuum from the condensation of the steam in the boiler after blowing out, a gauge-cock must be left open—unless an air-valve is fitted—which works the reverse way of a safety-valve.

In refilling a boiler after cleaning or blowing out, when cold water is used it should be let in very gradually, and not until the boiler is cool. When hot water is used, the boiler should be hot also, in order to avoid the danger of contraction and expansion. When a boiler is not to be used for some time, the water should be let out, and the boiler thoroughly cleaned and dried; and, to protect it from moisture, a light fire of shavings should be kindled in the ashpit about once a week, or else it should be filled quite full of water. The furnaces, flues, and connections should be swept clean; ashes

and clinkers should be raked out and carried away, and any defects in the masonry made good.

The cocks, valves, and all copper or brass pipes or fittings should be kept clean and bright. The floor, ceiling, and walls of the boiler-room should be kept clean also, and the boiler should be wiped off regularly.

Safety Valves.

A safety valve is designed to prevent the pressure in a boiler from exceeding a certain limit, by opening, when that limit is exceeded, and allowing the surplus steam to escape, until the pressure has fallen a little below that limit, when it closes.

To test a lever safety-valve, when there is no steam upon the boiler, it is necessary to know where the centre of gravity of the lever is located. This may be found by disconnecting the lever and trying it upon a knife-edge, at right angles to its length, until the position is found where it balances, which must be marked, and its distances from the fulcrum measured, and the lever weighed, as also the valve, and the weight used as a load; and the diameter of the valve must be measured. From these data the necessary calculations can be made.

There is a practical method of ascertaining the weight on a safety-valve, which is as follows:

Secure the valve stem of the safety-valve to the lever with a wire, but not rigidly; then affix a loop, into which you pass the hook of an accurate scale-beam; then secure the scale-beam so that it will take the weight of the lever and valve when weights are applied to it, and weigh the apparatus. The weight, as given on the scale, divided by the area of the valve in square inches, will give the pressure in pounds at which the steam will raise the valve. For small valves, an accurate spring balance may be used.

When a boiler is under steam, an accurate gauge can be attached to the steam-pipe, and the valve adjusted by means of that.

A dead-weight valve is a simple valve with a long stem, and is weighted by iron disks having a hole in their center for the stem to pass through, in order to secure them in place. In a sea-way they have the same defects as a common lever-valve. They can be tested by weighing the valve and the disks, and dividing the total weight by the valve area, or by the use of an accurate steam-gauge.

In a spring-loaded valve, the valve is kept in its seat by the pressure of a spring. This valve, no matter in what posi-

tion it is placed, always blows off at the pressure for which it is set.

A great advantage possessed by spring-loaded valves lies in the fact that firemen cannot overweight them by hanging old pieces of grate-bars, etc., on them, nor shore them down on their seats, which can be and often is done where a common lever safety-valve is used; and, again, they will close before the pressure has dropped a pound below the point at which they are set, thus avoiding waste of steam. They must be set by the use of a steam-gauge.

Safety-valves should be kept clean, and should be frequently tested to see that they work freely and are correctly weighted.

CORROSION.

A boiler from the time it is first set to work is constantly acted upon by forces, tending to destroy it, which are varying in strength and incontrollable. These forces are chemical as well as mechanical.

Corrosion is the strongest destructive force to which a boiler is subjected, and is of two kinds—external and internal.

Internal corrosion can be divided into three classes, known as: uniform corrosion or wasting; pitting or honey-combing; and grooving; so named from the appearances they present.

Uniform corrosion is that species of wasting of the plates, tubes, etc., where the water corrodes them, in a more or less even manner, in patches of large extent, and where there is usually no well defined line of demarcation between the sound and corroded part. It is like ordinary rusting in its character and effects, but is seldom so uniform. This is easily detected, and even when covered by a thick coating of incrustation, on emptying a boiler, it is shown by red streaks where the scale is cracked, or "bleeding" as it is sometimes called. But when detected, owing to its uniform appearance, the depth to which it has penetrated can only be determined by drilling holes through the plates and measuring the thickness.

Corrosion is apparently very capricious in its action. Two boilers, made exactly alike, of the same iron, and fed with the same water, and subjected to the same amount of work, will be differently affected. One may be attacked in the bottom, the other at the water line. Doubtless the differences in the qualities of the plates have much to do with this.

Again in some places boilers will be attacked generally on the shell, and in others they will suffer principally in the tubes, and in other places still, the rivet-heads and seams

suffer most. Sometimes the stays waste more rapidly than the plates. This action, so erratic, of the corrosive agents must be ascribed to their gravity, their concentration in certain parts, to the circulation of the water, to the nature of the iron, and other more obscure causes.

External corrosion is a more subtle agent in the destruction of stationary boilers than any kind of internal corrosion, and this is because its presence is less suspected, and it is not easily to be detected on account of the difficulty of getting at the plates.

Improper setting in brick-work often causes corrosion, the part of the boiler-shell exposed to the action of the probably impure lime having been badly eaten. And external corrosion is caused by leakage at joints, leakage of fittings, drippings from pipes, etc., moisture from wetting ashes near the boiler and moisture rising from the ground, etc. Cooling off the boiler too rapidly and filling it when it is warm are productive of leaky seams, and hasten the destruction of a boiler.

THINGS WORTH KNOWING.

To Repair a Feed or Other Water-Pipe.

Mix a stiff putty from white and red lead with boiled linseed oil, and work into it some hemp chopped into short lengths; lay it over the crack in a moderately thick mass; then wrap some strips of canvas (parceling) round the pipe tightly, overlapping both ends of the crack, and finish by serving marline over the parceling.

To Remove Rust from Iron.

Rub the places with lard mixed with sand.

To Keep Machinery from Rusting.

Take one ounce of camphor, dissolve it in one pound of melted lard, take off the scum and mix in as much fine black-lead as will give it iron color. Clean the machinery, and smear it with this mixture. After twenty-four hours rub clean with a soft linen cloth. It will keep clean for months under ordinary circumstances.

To Solder a Broken File.

Wet the break with muriate of zinc immediately; then heat a soldering-iron and tin the ends of the file. Heat the file pretty warm, not enough to start the temper, but rather too

warm to hold in the hand. When well tinned and hot, press the two pieces together, squeeze out all the solder, and let the file cool. Trim off the joint, and if well done, the file will break in another place the next time. Don't attempt to solder a broken file unless the break is a fresh one.

Cement Lining for Cisterns.

Mix, 2 parts of powdered brick,
2 parts of quicklime, and
2 parts of wood-ashes.

Make into a paste with boiled linseed oil.

Cement to Fasten Iron to Stone.

Take, 10 parts of fine iron filings,
30 parts of plaster of paris,
 $\frac{1}{2}$ part of sal ammoniac.

Mix with weak vinegar to a fluid paste and apply at once.

Plumber's Solder.

Melt together two parts of lead and one of tin.

To Braze Sheet-Iron.

Make a solution of borax and water for a flux, mix it with brass spelter and lay it thickly on the iron, and melt over a clear forge-fire; remove the work from the fire as soon as the spelter has run into the joint.

Tinman's Solder.

Melt together two parts of tin and one of lead. Use either rosin or muriate of zinc for a flux. When muriate of zinc is used, the joint, as soon as made, must be wiped with a wet rag to prevent discoloration of the tin.

To Wipe a Joint on a Lead Pipe.

Scrape the ends for about one and one-quarter inches, and paint with lamp-black and oil the part not to be soldered; rub tallow on the parts to be soldered, after scraping, for a flux. Open one end like a funnel with a wooden tampon, and cut the other end to be joined taper. Hold the ends together in position by clamps. Take several folds of canvas, well greased, in the left hand, which is held under the joint, and with a small iron ladle pour molten solder over the joint. With the pad in the left hand, catch the solder and press it on the joint; a red-hot soldering-iron remelts it, and forms a sound joint which is finished off with the pad.

NAMES BY WHICH PARTS OF HEATING SYSTEMS ARE KNOWN.

The Main Steam or Distributing Pipe—Is the name given to the nearly horizontal live-steam main, generally near the cellar ceiling.

The Main Return Pipe—The nearly horizontal pipe, used to carry the condensed water back to the boiler.

The Steam Riser—The pipe that carries the steam from the main distributing pipe to the radiators.

The Return Riser—The pipe that carries the condensed water from the radiators to the main return.

The Steam-Riser Connection—The pipe that joins the main distributing pipe and steam-riser.

The Return-Riser Connection—The pipe that connects the return-riser with the main return-pipe on the floor, and which has one or more T's in it, below the water-line, to receive the steam-riser relief.

The Steam-Riser Relief—The bottom of the steam-riser with a T, in the bottom of the return-riser connection, or main return pipe, below the water-line, to carry the water that runs down the steam-riser into the return-riser connection or main return pipe.

Main Relief Pipes—Connections between the main steam and return pipes, to throw the water carried from the boiler, and that condensed in the main steam-pipe into the return main, also employed as an equalizer of pressure in the system.

Water-Line—The general level of the water in the boiler and throughout the apparatus.

Pressure—Is the force of steam, usually expressed in pounds per square inch, and "elastic force;" "expansive force;" "tension," and "elasticity," convey similar meanings.

Temperature—The heat of steam, usually expressed in degrees of Fahrenheit's scale.

Density—The weight of a cubic foot of steam, compared to a cubic foot of water. In other words, weight of water in steam.

Maximum Density of Steam—The proper quantity of water in the steam, suitable to the pressure, i. e., when the steam is neither superheated nor laden with particles of water mechanically; dry saturated steam; dry steam.

Superheated Steam—Expanded by heat, or an increase of pressure by heat without the addition of water.

Volume—The space occupied by a given quantity of water, should the water be converted into steam, the relative volume decreases as the pressure increases.

Specific Gravity of Steam—The weight of its bulk, com-

pared to the same bulk of water, air, or any other substance it is contrasted with.

Specific Heat of Steam—The heat of a given weight, compared to a given weight of air, iron, or any other substance it is contrasted with.

HOW TO KEEP THE SCHOOLS CLEAN AND WHOLESMOE.

One of the most important duties in the care of school buildings is to see that the air or atmosphere of the rooms is kept fresh and pure and that woodwork and lavatories are kept clean and wholesome. Proper and adequate ventilation is best obtained by opening windows top and bottom. The fresh air rushes in one way, while the foul escapes the other. As far as possible this should be done immediately after the close of school.

To Clean Marble—Take two parts of common soda, one part of pumice stone, and one part of finely powdered chalk; sift it through a fine sieve, and mix it with water. Rub the marble well all over with the mixture, and the stains will be removed; then wash the marble with soap and water, and it will be as clean as it was at first.

To Take Ink-Stains Out of Mahogany—Put a few drops of spirits of nitre in a teaspoonful of water; touch the spot with a feather dipped in the mixture, and as soon as the ink disappears, rub it over with a rag wetted in cold water, or there will be a white mark, which will not be easily effaced.

To Clean Looking Glasses—First Wash the glass all over with lukewarm soapsuds and a sponge. When dry, rub it bright with a chamois leather on which a little prepared chalk, finely powdered, has been sprinkled.

For Cleaning Painted Wainscot or Other Woodwork—Fuller's earth will be found to do the work and on wood not painted it forms an excellent substitute for soap.

How to Care for and Clean Pianos—Dampness is very injurious to a piano; it ought not be exposed to draughts. They should be frequently dusted with a soft cloth and rubbed with flannel dipped in sweet, or in linseed oil.

Straw matting may be cleaned with a large coarse cloth dipped in salt and water, and then wiped dry. The salt prevents the matting turning yellow, or becoming mildewed.

Borax for Cleansing Purposes and as a Disinfectant—Alone or dissolved in water, and used freely wherever there are noisome smells, it acts as a purifier. It should be used frequently where sewer gas is suspected. A solution in hot water, allowed to cool, is excellent for cleaning floors and destroys all vermin with which the solution comes in contact.

QUESTIONS ASKED IN PREVIOUS EXAMINATIONS

JANITOR (1901).

Duties.

1. In a building where you are employed as janitor some of the halls have marble, others have floors of hard pine, with runners of coarse matting. How would you keep such floors clean? Give methods for each kind of floor for a single week.
2. In your building there are several large offices, each occupied daily by fifty or more clerks or other employes of the city. How should such offices be cared for night and morning, before and after business hours?
3. Would a large city building be more likely to receive proper care when the janitor hires and pays his own men or where the subordinates are furnished and paid by the Department of Public Buildings and Offices? Give reasons for answer.
4. To what extent should a janitor be held responsible for the care of chairs, tables and other furniture of a building where he is employed?
5. In a building like the City Hall or a Court House, has the janitor the right to interfere in a quarrel between citizens not in his employ? Give reasons for your answer.
6. At what temperature out of doors do you think the heating apparatus of a public building should be started up in the autumn? Should this question be left for decision to the janitor or not? What is the lowest temperature allowable with safety in a court room when business is going on?

JANITOR (1902).

Duties.

1. (a) How would you make fire in a hot-air furnace such as is used to heat the average house? (b) What kind of coal

is best suited to such a furnace and what name would you give it from the coal dealer? (c) Make a rough drawing of a hot-air furnace, showing how cold air reaches the fire, how the smoke is carried on and heat sent to the floors above. Do not forget to locate the dampers.

2. (a) How soon after putting fresh coal on the fire would you send heat into a building? (b) In cleaning out a furnace what precaution should be taken to prevent dust and soot from entering the rooms? (c) At what temperature would you keep the halls of public buildings in December? (d) If the thermometer registers 35 degrees Fahrenheit, would the atmosphere of the room be warm or cold?

3. How and with what materials would you clean: (a) painted walls; (b) brass railings; (c) hardwood floors; (d) window glass; (e) tiles of vestibules; (f) walnut piano?

4. (a) How would you prevent water in pipes from freezing in winter time? Give at least two different methods. (b) If a hot water boiler springs a leak and was flooding the cellar, what would you do?

5. (a) How many times a day should offices in a public building be swept? (b) What is the best method of dusting furniture after sweeping?

6. If you were a janitor in a public school and discovered a large fire in the cellar at 10 A. M., how would you notify the Fire Department and let the children out safely?

Arithmetic.

Addition, subtraction, multiplication and division.

JANITOR (1904).

Duties.

1. If you were a janitor of a Court House, state exactly how you would keep it in order as regards to the following particulars:

2 to 4. Give implements used, method of cleaning and how often each should be given attention. (a) There is an entrance hall, 50x40 feet, with a floor of stone tiling. (b) The main court room is 30x40 feet with hard wood parquet flooring. (c) The aisles are covered with strips.

5. If there was a strong smell of illuminating gas throughout a building, indicating a possible leak, what would you do?

6. What regulations of the Street Cleaning Department are to be observed by janitors of buildings?

7. What would you do in the following cases: (a) During a rain storm the water backs up through a sewer pipe into a cellar. (b) A leader becomes frozen so that the water from melting snow, having no outlet, comes through the roof and through the plastering of the ceiling on velvet carpet. (c) The railings are of polished brass. (d) The windows are of plate glass. (e) The floors of the private halls are of unpainted white pine. (f) The private offices are covered with Brussels carpet. (g) A public office is covered with linoleum.

8. Assuming any facts you wish, write a report to the proper officials concerning defective plumbing in a building of which you are janitor.

After the examination at which these questions were propounded, there was a decisive protest made by the Board of Education regarding the nature of the questions. The matter hung fire for months and the Civil Service Board finally consented, in June, 1905, to allow the Department a supplementary test which was to be open only to those who competed in the examination in October, 1904.

JANITOR (1905).

(Supplementary Paper on Steam Heating.)

Held June 26, 1905.

1. Describe fully the care to be taken of the ash pits and grates of steam heating furnaces.

2. What damage is likely to come to grates or grate bars if ashes are allowed to accumulate in ash pits, and what effect has such accumulation on the heating of the fire?

3 and 4. Describe fully everything you would do in the way of cleaning out, looking over, etc., in preparing a steam heating boiler in your charge to lay it up for the summer season?

5. What care of a heating boiler and furnace is necessary while in operation, in the way of keeping it clear and clean?

6. In firing a heating boiler, what is the best method in order to keep a uniform heat and economize fuel?

7. How would you "bank" a fire to keep over night?

8. In case you found the water in the boiler had gone very low and had a hot fire, what would you do to remedy the same and prevent an explosion?

9. What is the purpose of the double system of pipes usually connected to steam radiators?

10. (a) What is the purpose of the air valve on steam radiators? (b) How does the automatic air valve operate

and how would you adjust one in case it did not allow the radiator to fill or allowed steam to escape after the radiator was filled?

11. What is the best kind of packing for the valves on steam heating?

JANITOR AND JANITOR-ENGINEER (1905).

Duties.

1 and 2. What materials would you use for cleaning the following parts of a building under your charge: (a) varnished woodwork; (b) windows; (c) floors in rooms much used; (d) metal work; (e) in cleaning hard pine and maple floors, would you use different material? If so, what and why? (In any of these processes if you would use mixtures of different substances, give proportions or quantities of same.)

3. (a) What is required by city ordinances in regard to cleaning of snow from sidewalks, etc.? (b) What care and attention would you give to the roofs of buildings under your charge?

4. In case the gas burners flickered or went up and down, what would you consider the trouble and how would you proceed to remedy it?

5. (a) What special care and attention is required with automatic flushing tanks? (b) What with storage and supply tanks and ball-cocks?

6. Supposing you were to be relieved from duty for a day or two; state what instructions or directions you would give to the person in charge during your absence.

7. If a building was to be closed for some time in cold weather, state fully what steps you would take to protect the plumbing and heating apparatuses.

8. (a) What is the best way to thaw out frozen or chilled pipes? (b) What would you do in case of a stoppage in the drain drops of a building?

9. Describe in full how you would keep in the best of order and operate a low pressure heating apparatus: (a) the boiler and its attachments; (b) the firing; (c) the radiators and attachments; (d) what is the purpose of the thermostatic system?

10. Read the meters submitted and put numbers of meters and readings on the paper; also state the meaning of the "constant" or multiplier figure often seen on electric meters.

11. (a) Does a pump designed to pump hot water differ in construction from one designed to pump cold water? If so,

in what way? (b) A boiler feed pump—what valves, if any, are between the pump and boiler and what is their use?

12. How would you proceed to "square" the shaft of an engine? (b) What is the "counterboard" of a cylinder and what is its purpose? (c) What effect has the "lap" of a valve on the distribution of steam in the cylinder?

13. Describe fully how you would proceed to clean out and thoroughly examine a steam-boiler inside and out.

14. (a) State every point to be observed in the surroundings and care of electric meters to insure their safe and efficient operation; (b) also blowers and fans.

15. (a) Describe briefly the difference between natural and mechanical systems of ventilation and buildings; (b) state the points that need the most frequent inspection and repairs in electric elevators.

Arithmetic.

Addition, subtraction, multiplication and division.

JANITOR-ENGINEER.

Management of Boiler.

1. State what engine or engines you have had in your entire charge, and describe them in a general way.

2. State all the ways in which injectors may cease to act, or may act badly, and give the reasons for such difficulties.

3. (a) Is it a good or bad plan to open the fire door to a boiler to govern the draught? (b) Give clearly your reasons for so thinking.

4. Suppose a boiler to be hot and the water low, does it have any effect to fill it rapidly under such conditions? If so, what is the effect?

5. (a) Describe all the reasons there may be for the main bearings to an engine running hot. (b) State what you would do if you found these bearings to be running hot.

6. (a) Does the governor of an engine ever get out of order or cease to act? (b) If so, state how.

7. What causes may there be for the blowing off of a cylinder head?

8. Is it ever necessary for an engineman to take off the cylinder-head of his engine? If so, for what reasons, and what examinations should be made?

9. What do you understand by the term "lap," as applied to an engine, and what is accomplished by it?

10. Does a change in the wind make any difference in the

distribution of heat to the several rooms in a building? If so, what, and how can you correct it?

11. What is the best kind of packing for the valves on steam-heaters, and what is it made of?

12. (a) Is there any difference in the effect of the various kinds of oils on boilers? (b) What are the effects? (c) Is there any kind of oil that acts as a preservative?

13. What is the object of lifting the safety-valve of a boiler, and why is it done?

14. In order to get the greatest amount of heat from the coal burning under a boiler which is set in brickwork, where would you expect to find rust on the exterior?

General Paper.

1. Apart from the required character and ability, what do you consider to be the most essential qualifications for the position? Why?

2. Suppose the water main which supplies your school should freeze, what would you do?

3. You find an unruly woman talking in a disorderly way to a crowd of children in a hallway, what would you do?

4. State fully what would be your method of supervision of closets and hallways, both in and out of school hours.

5. A portion of a stairway is found to be in a dangerous condition. Write a report of the case, and your action to the proper authority.

Arithmetic.

1. Add 478955, 892377, 764985, 422679, 875377.
2. Subtract 530988 from 820437.
3. Multiply 79068 by 5087.
4. Divide 2306752 by 3794.

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STATIONARY ENGINEMAN.

Technical.

1. Describe the best method of firing a boiler, using either hard or soft coal to get the most heat and use the least coal.

2. (a) How would you proceed to "bank" a fire? (b) What care is necessary in regard to grates and fire box to keep in best condition?

3. How do fire tube and water tube differ in construction and general points of design?

4. Having a boiler with steam on, describe fully how you would proceed to clean it thoroughly inside and out and examine the evidence of wear or deterioration.

5. What is the use of the governor of an engine and what accident may render a belt-driven governor useless?

6. What are the most common causes of "pounding" in an engine?

7. How would you test a crank pin to see if it was square with the crank?

8. How would you proceed to line up an engine?

9. Why do you center from the counter-bores of the cylinder in lining up an engine and not from the bore?
10. What do you understand by the expressions "cut off" and "lead?"
11. What is the effect on the steam in the cylinder of an engine of "steam lap"? What of "exhaust lap?"
12. Explain the difference between a high pressure and a condensing engine and state where the gain of power or economy came in.
13. Name all of the troubles you are familiar with that would cause feed pumps to work poorly.
14. State fully everything you would think necessary to do about your engine and plant before starting up in the morning.
15. In the same manner state everything you would see to and do about your plant in closing down at night. If the night promised to be very cold, what extra precaution would you take?

Arithmetic.

Give all the figuring on the ruled sheets.

1. What is the area in square inches of a safety valve $3\frac{1}{2}$ inches in diameter?
2. At 35 cubic feet to the ton, how many tons of coal in a bin 16 feet long 9 feet wide and 5 feet deep?
3. A safety valve of 2 square inches in area has a lever of 14 inches long arm and 2 inches short arm, weight 15 pounds. At what pressure would it lift?
4. Divide 26897432 by 8729.

STATIONARY ENGINEER AND JANITOR ENGINEER.

Technical.

Date: December 20, 1907.

To be finished by 1.30 P. M.

1. How would you proceed to clean a fire? How to bank a fire?
2. How would you go to work to clean out and examine for evidences of wear and corrosion, a boiler in your charge?
3. Where is the water line of a horizontal tubular boiler? What is the purpose of a blow-off pipe and where is it located? How would you stop a leak in the center of a boiler tube?
4. In case the water dropped out of sight in a boiler having a good fire, what would you do to prevent an explosion?

5. What is the difference in action between an Injector and a feed pump? What differences in construction and setting, if any, in feed pumps to pump hot or cold water and give reasons for same.
6. What is meant by "Lap"? What by "Compression"?
7. What is an eccentric and how would you proceed to set one that had slipped?
8. How would you proceed to square an engine?
9. Describe the construction and action of the automatic shaft or fly-wheel governor.
10. What care is necessary in the installation and use of Alternating Current Electric Motors and their electrical attachments to keep in the best order?
11. State fully all of the operations necessary and points to observe in starting and stopping Alternating Current Electric Motors.
12. In case an electric bell rang continuously, where would you look for the trouble and how remedy it?
13. Describe the construction and operation of a mechanical system of heating and ventilating for a large building. What special care should be taken of the blowers and blower-pits?
14. What special care should be taken of the Main Electric Switch when leaving the building? What is your opinion of the use of oil on wooden stairs? What care should be taken of ball-cocks in flushing tanks?
15. Mark on the meter dials on sheet given the following readings:

9,190,000 678,900 1,839,200 667,800

(Note—Credit will be given only for the exact position of the pointers on the dials.)

MATHEMATICS.

Give all the figuring on the ruled sheets.

1. Multiply 2876.54 by 67.8.
2. Divide 29347218 by 634.
3. What would be the cubic contents of a room 28 ft. long, 20 ft. 6 in. wide and 10 ft. 6 in. high.
4. A bin will hold 63 tons of coal. What would it cost to fill it at \$5.48 per ton?

JANITOR—STEAM HEATING.

Technical.

Date: April 5, 1910.

Weight 7.

To be Finished by 1:30 P. M.

- 1 & 2. Describe some form of steam heating boiler with

which you are familiar, covering such points as general form and description, size, form of setting, good and bad features, etc.

3. Describe the Safety Valve, its use, where located on boiler and what care or attention should it have?

4. The Water Column and Gauge Glass; where located on boiler, its use and what care should it have?

5. Describe the automatic draught and damper regulator. How can it be adjusted for different amounts of heat required?

6. How would you fire and run a boiler on a day when but little heat was needed? How on a very cold day when much heat was needed?

7. Why should the tubes or flues of a boiler be cleaned and how often should it be done?

8. What is the cause of the burning or warping of grate-bars and how can it be prevented?

9. In case you should discover that there was no water showing in gauge glass and all jet cocks gave steam, with a good fire and pressure on, what would you do?

10. Describe the form of air valve usually found on steam radiators. How constructed, its use, and how adjusted?

Technical (Continued) Weight 3.

To be Finished by 4 P. M.

11. State exactly and in detail what you would do in each of the following cases, if you were the janitor of a public school:

(a) A pupil reports to you that paper in a storeroom on the ground floor has caught fire.

(b) A policeman informs you that there is a small fire in a tenement house across the street.

(c) A teacher sends you a message that a pupil has vomited in a classroom.

12. With regard to unused rooms, what precautions against fire would you think it well to take?

13. You are placed in charge of a small school building of twelve classrooms and you find that the supplies needed for the proper performance of your work are exhausted. Make out a list of the supplies referred to sufficient to last one month.

14. What system would you recommend for ventilating the rooms of a building in cold weather, when it is not deemed advisable to open the windows on account of draughts?

15. What directions would you give your helper about going into rooms to do any preliminary work before the rooms are vacated for the day?

16. What are the present requirements of the Street Cleaning Department to be followed by householders, for the removal of ashes; of garbage; of refuse and paper?

17. What special attention would you give to (a) marble; (b) parquet floors; (c) mahogany furniture; (d) brass, and (e) windows?

18. To what extent, if any, is a janitor concerned with the behavior of scholars in and around his school building?

19. Enumerate the extra duties which a school janitor should perform on a very stormy day.

20. If called in to remedy each of the following annoyances, how would you proceed?

(a) There is a hammering in the steam pipes running up from floor to floor.

(b) There is a hissing in such pipes.

(c) There is a hissing in the valve through which the steam enters the radiator.

(d) There is a hissing or whistling in the small automatic relief valve. Give your reasons in each instance.

Experience—Weight 4.

(To be sworn to).

Note.—Full, accurate, clear and concise answers are required. Investigation of the correctness of your statements will be made. Any false statement will result in disqualification in this and future examinations.

1. Give age and place of birth; if not a native of the United States, state how long you have been a resident.

2. Give a full account of your education with dates, studies, place of school and other particulars.

3. What has been your occupation since leaving school? Give particulars, such as nature of occupation, length of employment in each, etc.

4. By whom, if at all, have you been employed for the last five years. Give particulars, names and addresses of employers, nature of employment, etc. If you have been working for yourself, state what your occupation has been.

5. Give the names and addresses of not less than three nor more than five references to whom application may be made for verification of your statements.



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